SEQUENCE LISTING

<110> Ditzel, H.
Burton, D.
Schaller, M.

<120> Autoantibodies to glucose-6-phosphate isomerase and their participation in autoimmune disease

<130> 1361.005US2

<140> US 10/630,009
<141> 2003-07-29

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<151> 2001-04-06

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Ala Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr
        35                  40                  45
Trp Ala Ser Thr Arg Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser
    50                  55                  60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu
65                  70                  75                  80
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Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Thr Leu Gln
        35                  40                  45
Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe
    50                  55                  60
Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr
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Cys Gln Gln Leu Asn Ser Tyr Pro Leu Thr Phe Gly Gly Gly Ala Lys
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            20   25   30
Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg
        35   40   45
Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
    50   55   60
Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr
65   70   75   80
Tyr Cys Gln Gln Tyr Gly Ser Ser Pro Arg Thr Phe Gly Gln Gly Thr
                85   90   95
Lys Val Glu Ile Lys Arg Thr Val Ala
            100   105

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Lys Ser Ser Gln Ser Val Phe Tyr Thr Ser Asn Asn Lys Asn Tyr Leu
            20   25   30
Ala Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr
        35   40   45
Trp Ala Ser Thr Arg Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser
    50   55   60
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu
65   70   75   80
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                85   90   95
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Arg Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg
        35   40   45
Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
    50   55   60
Phe Ser Phe Thr Ile Ser Ser Leu Gln Pro Glu Asp Thr Gly Thr Tyr
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            20   25   30
Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg
        35   40   45
Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
    50   55   60
Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr
65   70   75   80
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Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
    50   55   60
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                85   90   95
Lys Val Glu Ile Lys Arg Thr Val Ala
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            20   25   30
Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Leu Leu Ser Ser Asp Gly
        35   40   45
Ser Asn Lys Phe Tyr Ile Glu Ser Val Lys Gly Arg Phe Thr Ile Ser
    50   55   60
Lys Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg
65   70   75   80
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                85   90   95
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            20   25   30
Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Leu Leu Thr Met Asp Arg
        35   40   45
Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Leu
    50   55   60
Ser Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys Thr Asn Ser
65   70   75   80
Glu Val Gly Ala Thr Ala Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
                85   90   95
Thr Val Ser Ser
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            20   25   30
Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Val Ile Ser Tyr Asp Gly
        35   40   45
Asn Lys Lys Tyr Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser
    50   55   60
Lys Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg
65   70   75   80
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                85   90   95
Thr Ala Phe Asn Tyr
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            20   25   30
Ala Pro Gly Gln Gly Leu Gln Trp Met Gly Arg Ile Asn Pro Thr Gly
        35   40   45
Gly Gly Val Ser Leu Ala Gln Ser Phe Gln Asp Arg Val Ser Leu Thr
    50   55   60
Arg Asp Arg Ser Ser Asn Thr Val Phe Leu Glu Leu Ser Gly Leu Thr
65   70   75   80
Glu Glu Asp Thr Ala Leu Tyr Phe Cys Ala Arg Pro Arg Phe Asn Met
                85   90   95
Ile Arg Glu Pro Leu Asp Leu Trp Gly Gln Gly Thr Val Val Thr Val
            100   105   110

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35 40 45
Gly Ser Thr Phe Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser
50 55 60
Arg Asp Asn Ser Lys Asn Thr Ala Phe Leu Arg Met Asn Ser Gln Arg
65 70 75 80
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85 90 95
Ala Tyr Tyr Tyr Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val
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Thr Val Ser Ser
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20 25 30
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35 40 45
Arg Gly Thr Thr Asn Tyr Asn Arg Val Phe Gly Ser Arg Val Ser Met
50 55 60
Ser Val Asp Met Ser Arg Ser Gln Phe Phe Leu Glu Leu Arg Asp Val
65 70 75 80
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20 25 30
Ala Pro Gly Gln Gly Leu Glu Trp Met Gly Gly Ile Ile Pro Pro Phe
35 40 45

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Gly Pro Val Asn Tyr Ala Gln Lys Phe Gln Gly Arg Val Thr Ile Thr
    50                  55                  60
Ala Asp Asp Ser Thr Asn Thr Ala Tyr Met Gly Leu Ser Ser Leu Arg
65                  70                  75                  80
Ser Gly Asp Thr Ala Val Tyr Tyr Cys Ala Arg Val Ala Tyr Asp Gly
                85                  90                  95
Ser Gly Tyr Tyr Asn Asn Ile Pro Lys Ile Tyr Tyr Tyr Ser Tyr Met
            100                 105                 110
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1 5 10 15
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1 5 10 15
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1 5 10

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Arg Ala Ser Gln Gly Ile Ser Ser Tyr Leu Ala
 1   5   10

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 1   5   10

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Lys Ser Ser Gln Ser Val Phe Tyr Thr Ser Asn Asn Lys Asn Tyr Leu
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20 25 30

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 1   5   10   15
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            20   25   30

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            20   25   30

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            20   25   30

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            20   25   30

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            20   25   30

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 1   5   10

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<212> PRT
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<400> 89
Trp Tyr Gln Leu Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr
1 5 10 15

<210> 90
<211> 15
<212> PRT
<213> Homo sapiens

<400> 90
Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
1 5 10 15

<210> 91
<211> 15
<212> PRT
<213> Homo sapiens

<400> 91
Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr
1 5 10 15

<210> 92
<211> 15
<212> PRT
<213> Homo sapiens

<400> 92
Trp Tyr Gln Gln Arg Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
1 5 10 15

<210> 93
<211> 15
<212> PRT
<213> Homo sapiens

<400> 93
Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
1 5 10 15

<210> 94
<211> 15
<212> PRT
<213> Homo sapiens

<400> 94
Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
1 5 10 15

<210> 95
<211> 32
<212> PRT
<213> Homo sapiens

<400> 95
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
1 5 10 15
Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
20 25 30

<210> 96
<211> 32
<212> PRT
<213> Homo sapiens

<400> 96
Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr
1 5 10 15
Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys
20 25 30

<210> 97
<211> 32
<212> PRT
<213> Homo sapiens

<400> 97
Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
 1   5   10   15
Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys
            20   25   30

<210> 98
<211> 32
<212> PRT
<213> Homo sapiens

<400> 98
Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
 1   5   10   15
Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
            20   25   30

<210> 99
<211> 32
<212> PRT
<213> Homo sapiens

<400> 99
Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Ser
 1   5   10   15
Phe Thr Ile Ser Ser Leu Gln Pro Glu Asp Thr Gly Thr Tyr Tyr Cys
            20   25   30

<210> 100
<211> 32
<212> PRT
<213> Homo sapiens

<400> 100
Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
 1   5   10   15
Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys
            20   25   30

<210> 101
<211> 32
<212> PRT
<213> Homo sapiens

<400> 101
Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
 1   5   10   15
Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys
            20   25   30

<210> 102
<211> 14
<212> PRT
<213> Homo sapiens

<400> 102
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
 1   5   10

<210> 103
<211> 14
<212> PRT
<213> Homo sapiens

<400> 103
Phe Gly Gly Gly Ala Lys Val Gly Ile Arg Arg Thr Val Ala
 1   5   10

<210> 104
<211> 14
<212> PRT
<213> Homo sapiens

<400> 104
Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
 1   5   10

<210> 105
<211> 14
<212> PRT
<213> Homo sapiens

<400> 105
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
 1   5   10

<210> 106
<211> 14
<212> PRT
<213> Homo sapiens

<400> 106
Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala
 1   5   10

<210> 107
<211> 14
<212> PRT
<213> Homo sapiens

<400> 107
Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala
 1   5   10

<210> 108
<211> 14
<212> PRT
<213> Homo sapiens

<400> 108
Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
 1   5   10

<210> 109
<211> 332
<212> DNA
<213> Homo sapiens

<400> 109
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tcagtagtca tggctcgcac tgggtccgcc aagctccagg caaggggctg gagtgggtgg 120

cacttttgtc gtctgatgga agtaataaat tctatataga atccgtgaag ggccgattca 180
ccatctccaa ggacaattct aagaacacac tgtatctgca aatgaacagc ctgagaattg 240
acgacacggc tgtctattac tgtgcgattt ccctggtggg aactaccgct tttaactact 300
ggggccaggg aaccctggtc accgtctcct ca 332

<210> 110
<211> 331
<212> DNA
<213> Homo sapiens

<400> 110
ggcgtggtcc aagcatggag gtccctaaga ctctcctgtg tagcctgtgg attcaccttc 60
agtagtcata ccatgcactg ggtccgccag gctccaggca aggggctgga gtgggtggca 120
cttatattct atgatggaag taataaatac tatgcagact ccgtgaaggg ccgattcacc 180
atctccagag acaattccaa gaacacgctg tatctgcaat tgagcagcct aagacctgag 240
gacacggctg tctattattg tacgaattcc gaggtgggag ctaccgcttt tgactactgg 300
ggccagggaa ccctggtcac cgtctcctca g 331

<210> 111
<211> 335
<212> DNA
<213> Homo sapiens

<400> 111
ggggaggcgt ggtccagcct gggaggtccc tgagactttt cctgtgcagc ctctggattc 60
accttcagtt cctatacttt ccactgggtc cgccaggctc caggcaaggg gctggagtgg 120
gtggcagtta tatcatatga tggaaacaag aaatactacg cagactccgt gaagggccga 180
ttcaccatct ccagagacaa ttccaagaac actctatatc tgcaaatgaa cagcctgaga 240
gttgaggaca cggctgttta ttactgtgcg atttccatag tgggaactac cgcttttaac 300
tactggggcc agggaaccct ggtcaccgtc tcctc 335

<210> 112
<211> 327
<212> DNA
<213> Homo sapiens

<400> 112
ccagactccc tggctgtgtc tctgggcgag agggccacca tcaactgcaa gtccagccag 60
agtgtttttt acacttccaa caataagaac tacttagctt ggtaccagca gaaaccaggc 120
cagcctccta agttgctcat ttactgggca tccacccggg aatccggggt ccctgaccga 180
ttcagtggca gcgggtctgg gacagatttc actctcacca tcagcagcct gcaggctgaa 240
gatgtggcag tttattactg tcagcaatat tatgattcgt acacttttgg ccaggggacc 300
aagctggaga tcaaacgaac tgtggct 327

<210> 113
<211> 312
<212> DNA
<213> Homo sapiens

<400> 113
ccatccttcc tgtctgcatc tgtaggagac agagtcacca tcacttgccg ggccagtcaa 60
ggcattagca gttatttagc ctggtatcag ctaaaaccgg ggaaagcccc taagctcctg 120
atctatgctg catccacttt gcaaagtggg gtcccatcaa ggttcagcgg cagtggatct 180
gggacagaat tcactctcac aataagcagc ctgcagcctg aagattttgc aacttattac 240
tgtcaacagc ttaatagtta ccctctcact ttcggcggag gggccaaggt ggggatcaga 300
cgaactgtgg ct 312

<210> 114
<211> 315
<212> DNA
<213> Homo sapiens

<400> 114
ccaggcaccc tgtctttgtc tccaggggaa agagccaccc tctcctgcag ggccagtcag 60
agtgttagca gcagctactt agcctggtac cagcagaaac ctggccaggc tcccaggctc 120
ctcatctatg gtgcatccag cagggccact ggcatcccag acaggttcag tggcagtggg 180
tctgggacag acttcactct caccatcagc agactggagc ctgaagattt tgcagtgtat 240
tactgtcagc agtatggtag ctcacctcgg acgttcggcc aagggaccaa ggtggaaatc 300
aaacgaactg tggct 315

<210> 115
<211> 327
<212> DNA
<213> Homo sapiens

<400> 115
ccagactccc tggctgtgtc tctgggcgag agggccacca tcaactgcaa gtccagccag 60
agtgtttttt acacttccaa caataagaac tacttagctt ggtaccagca gaaaccaggc 120
cagcctccta agttgctcat ttactgggca tccacccggg aatccggggt ccctgaccga 180
ttcagtggca gcgggtctgg gacagatttc actctcacca tcagcagcct gcaggctgaa 240
gatgtggcag tttattactg tcagcaatat tatgattcgt acacttttgg ccaggggacc 300
aagctggaga tcaaacgaac tgtggct 327

<210> 116
<211> 315
<212> DNA
<213> Homo sapiens

<400> 116
ccaggcaccc tgtcattgtc tccaggggaa ggagccaccc tctcctgcag ggccagtcag 60
agtgttagca gcagctacct agcctggtat cagcagagac ctggccaggc tcccaggctc 120
ctcatctatg gtgcatccag cagggccacc ggcatcccag acagattcag tggaagtgga 180
tctgggacag atttcagttt caccatcagc agtctgcagc ctgaagatac tgggacatat 240
tactgtcaac aatatgataa tgtccctgac acttttggcc aggggaccag gctggagatc 300
aaacgaactg tggct 315

<210> 117
<211> 312
<212> DNA
<213> Homo sapiens

<400> 117
ccaggcaccc tgtctttgtc tccaggggaa ggagccaccc tctcctgcag ggccagtcag 60
agtgttagca gcagctactt agcctggtac cagcagaaac ctggccaggc tcccaggctc 120
ctcatctatg gtgcatccag tagggccact ggcatcccag acaggttcag tggcagtggg 180
tctgggacag acttcactct caccatcagc agactggagc ctgaagattt tgcagtgtat 240
tactgtcagc agtatggtac ctcacccctc ttcggccaag ggacacgact ggagattaaa 300
cgaactgtgg ct 312

<210> 118
<211> 315
<212> DNA
<213> Homo sapiens

<400> 118
ccaggcaccc tgtctttgtc tccaggggaa agagtcactc tctcctgcag ggccagtcag 60
agtgttagca gcagttactt agcctggtac cagcagaaac ctggccaggc tcccaggctc 120
ctcatctatg gtgcatccag cagggccact ggcatcccag acaggttcag tggcagtggg 180
tctgggacag acttcactct caccatcagc agactggagc ctgaagactt tgcagtttat 240
tactgtcagc agtatggaag ctcacctcgg acgttcggcc aagggaccaa ggtggaaatc 300
aaacgaactg tggct 315

<210> 119
<211> 342
<212> DNA
<213> Homo sapiens

<400> 119
ggggctgagg gtgaggaagc ccggacctcc gtgaggatct cttgcagggc atctggaaac 60
accttcactg gccaccatat tcactgggtc cgccaggccc ctggacaagg ccttcagtgg 120
atgggaagaa tcaacccgac tggcggcggc gttagtctcg cacagagttt ccaggacaga 180
gtcagcctga ccagggacag gtcgtccaat acagtcttct tggaactgag cggcctcacg 240
gaggaggaca cggccttata tttctgtgcg aggccccgat ttaacatgat ccgggaacct 300
cttgacctct ggggccaggg gacagtggtc accgtctcct ca 342

<210> 120
<211> 348
<212> DNA
<213> Homo sapiens

<400> 120
gggggaggct tggtacagcc tgggggggtcc ctgagactct cctgtgcaac ctctggattc 60
atctttaaca gctatgccat gaactgggtc cgccaggctc cagggaaggg gcttgagtgg 120
gtctcacgta ttagtggaaa tagtggaagc acattctacg cagactccgt gaagggccgg 180
ttcaccatct ccagagacaa ttccaagaac acggcgtttc tgcgaatgaa cagccagaga 240
gccgaagaca cggccgttta ttactgtgcg aaagatctgt cgagtggtgc atactactac 300
tacgggatgg acgtctgggg ccaagggacc acggtcaccg tctcctca 348

<210> 121
<211> 342
<212> DNA
<213> Homo sapiens

<400> 121
ggcccaggat tggtgaggcc atcacagacc ctatccctca cctgcactgt ctctccaggc 60
tccattaaag gtgatagtta cttctggagc tgggtccgtc agcccgtagg gaagggactg 120
gagtggatag ggcgtatcta cggcagaggg actaccaatt acaaccgtgt tttcgggagt 180
cgagtcagta tgtcagtgga catgtccagg agtcagtttt tcttggaatt gagagatgtg 240
accgccgcag acacggccgt ctattactgt gcgagagaca aggggtccga atactcctac 300
tttgacccct ggggccaggg aatagtggtc aacgtcttct ca 342

<210> 122
<211> 376
<212> DNA
<213> Homo sapiens

<400> 122
gggctgaggt gaagaagcct gggtcctcgg tgaaggtctc ctgcagggct tctggaggca 60
cattcagcag atatgctatc agctgggtgc gacaggcccc tggacaaggg cttgagtgga 120
tgggagggat catccctccc tttggtccag taaactacgc acagaagttc cagggcagag 180
tcacgattac cgcggacgat tccacgaaca cagcctacat gggtctgagc agcctgagat 240
ctggggacac ggccgtgtat tactgcgcga gagtggccta tgatggtagt ggctattaca 300
acaatatccc aaagatctac tactactcct acatggacgt ctggggcaaa gggaccacgg 360
tcaccgtgtc ctcagc 376

<210> 123
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> A synthetic flexible five amino acid tether.

<400> 123
Gly Gly Gly Gly Ser
1 5